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#13



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RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/825,242C

DATE: 05/15/2002 P.6  
TIME: 16:24:44

Input Set : A:\SUB19496-18.APP

Output Set: N:\CRF3\05152002\I825242C.raw

```

3 <110> APPLICANT: Eisenberg, Stephen P.
4     Case, Casey C.
5     Cox III, George N.
6     Jamieson, Andrew
7     Rebar, Edward J.
8     Sangamo Biosciences, Inc.
10 <120> TITLE OF INVENTION: Selection of Sites for Targeting by Zinc Finger
11     Proteins and Methods of Designing Zinc Finger Proteins
12     to Bind to Preselected Sites
14 <130> FILE REFERENCE: 019496-001810US
16 <140> CURRENT APPLICATION NUMBER: US 09/825,242C
17 <141> CURRENT FILING DATE: 2001-04-02
19 <160> NUMBER OF SEQ ID NOS: 97
21 <170> SOFTWARE: PatentIn Ver. 2.1
23 <210> SEQ ID NO: 1
24 <211> LENGTH: 25
25 <212> TYPE: PRT
26 <213> ORGANISM: Artificial Sequence
28 <220> FEATURE:
29 <223> OTHER INFORMATION: Description of Artificial Sequence:exemplary motif
30     characterizing the C-2H-2 class of zinc finger
31     proteins (ZFP)
33 <220> FEATURE:
34 <221> NAME/KEY: MOD_RES
35 <222> LOCATION: (1)..(25)
36 <223> OTHER INFORMATION: Xaa = any amino acid
38 <220> FEATURE:
39 <221> NAME/KEY: MOD_RES
40 <222> LOCATION: (4)..(5)
41 <223> OTHER INFORMATION: Xaa = any amino acid, may be present or absent
43 <220> FEATURE:
44 <221> NAME/KEY: MOD_RES
45 <222> LOCATION: (23)..(24)
46 <223> OTHER INFORMATION: Xaa = any amino acid, may be present or absent
48 <400> SEQUENCE: 1
W--> 49 Cys Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
50     1           5           10          15
W--> 52 Xaa Xaa His Xaa Xaa Xaa Xaa Xaa His
53           20           25
56 <210> SEQ ID NO: 2
57 <211> LENGTH: 5
58 <212> TYPE: PRT
59 <213> ORGANISM: Artificial Sequence

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61 <220> FEATURE:
62 <223> OTHER INFORMATION: Description of Artificial Sequence:peptide linker
64 <400> SEQUENCE: 2
65 Thr Gly Glu Lys Pro
66   1           5
69 <210> SEQ ID NO: 3
70 <211> LENGTH: 5
71 <212> TYPE: PRT
72 <213> ORGANISM: Artificial Sequence
74 <220> FEATURE:
75 <223> OTHER INFORMATION: Description of Artificial Sequence:peptide linker
77 <400> SEQUENCE: 3
78 Gly Gly Gly Gly Ser
79   1           5
82 <210> SEQ ID NO: 4
83 <211> LENGTH: 8
84 <212> TYPE: PRT
85 <213> ORGANISM: Artificial Sequence
87 <220> FEATURE:
88 <223> OTHER INFORMATION: Description of Artificial Sequence:peptide linker
90 <400> SEQUENCE: 4
91 Gly Gly Arg Arg Gly Gly Gly Ser
92   1           5
95 <210> SEQ ID NO: 5
96 <211> LENGTH: 9
97 <212> TYPE: PRT
98 <213> ORGANISM: Artificial Sequence
100 <220> FEATURE:
101 <223> OTHER INFORMATION: Description of Artificial Sequence:peptide linker
103 <400> SEQUENCE: 5
104 Leu Arg Gln Arg Asp Gly Glu Arg Pro
105   1           5
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109 <211> LENGTH: 12
110 <212> TYPE: PRT
111 <213> ORGANISM: Artificial Sequence
113 <220> FEATURE:
114 <223> OTHER INFORMATION: Description of Artificial Sequence:peptide linker
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117 Leu Arg Gln Lys Asp Gly Gly Gly Ser Glu Arg Pro
118   1           5           10
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122 <211> LENGTH: 16
123 <212> TYPE: PRT
124 <213> ORGANISM: Artificial Sequence
126 <220> FEATURE:
127 <223> OTHER INFORMATION: Description of Artificial Sequence:peptide linker
129 <400> SEQUENCE: 7
130 Leu Arg Gln Lys Asp Gly Gly Gly Ser Gly Gly Gly Ser Glu Arg Pro

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131      1              5              10              15
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135 <211> LENGTH: 85
136 <212> TYPE: PRT
137 <213> ORGANISM: Mus sp.
139 <220> FEATURE:
140 <223> OTHER INFORMATION: DNA binding domain of mouse transcription factor
141      Zif268
143 <400> SEQUENCE: 8
144 Tyr Ala Cys Pro Val Glu Ser Cys Asp Arg Arg Phe Ser Arg Ser Asp
145      1              5              10              15
147 Glu Leu Thr Arg His Ile Arg Ile His Thr Gly Gln Lys Pro Phe Gln
148      20              25              30
150 Cys Arg Ile Cys Met Arg Asn Phe Ser Arg Ser Asp His Leu Thr Thr
151      35              40              45
153 His Ile Arg Thr His Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys
154      50              55              60
156 Gly Arg Lys Phe Ala Arg Ser Asp Glu Arg Lys Arg His Thr Lys Ile
157      65              70              75              80
159 His Leu Arg Gln Lys
160      85
163 <210> SEQ ID NO: 9
164 <211> LENGTH: 94
165 <212> TYPE: PRT
166 <213> ORGANISM: Artificial Sequence
168 <220> FEATURE:
169 <223> OTHER INFORMATION: Description of Artificial Sequence:amino acids
170      531-624 in Sp-1 transcription factor
172 <400> SEQUENCE: 9
173 Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly Cys Gly Lys
174      1              5              10              15
176 Val Tyr Gly Lys Thr Ser His Leu Arg Ala His Leu Arg Trp His Thr
177      20              25              30
179 Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly Lys Arg Phe
180      35              40              45
182 Thr Arg Ser Asp Glu Leu Gln Arg His Lys Arg Thr His Thr Gly Glu
183      50              55              60
185 Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met Arg Ser Asp
186      65              70              75              80
188 His Leu Ser Lys His Ile Lys Thr His Gln Asn Lys Lys Gly
189      85              90
192 <210> SEQ ID NO: 10
193 <211> LENGTH: 98
194 <212> TYPE: PRT
195 <213> ORGANISM: Artificial Sequence
197 <220> FEATURE:
198 <223> OTHER INFORMATION: Description of Artificial Sequence:Sp-1
199      transcription factor consensus sequence
201 <400> SEQUENCE: 10

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```

202 Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
203   1           5           10           15
205 His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Lys Ser Ser His Leu
206           20           25           30
208 Arg Ala His Gln Arg Thr His Thr Gly Glu Arg Pro Tyr Lys Cys Pro
209           35           40           45
211 Glu Cys Gly Lys Ser Phe Ser Arg Ser Asp Glu Leu Gln Arg His Gln
212   50           55           60
214 Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
215   65           70           75           80
217 Ser Phe Ser Arg Ser Asp His Leu Ser Lys His Gln Arg Thr His Gln
218           85           90           95
220 Asn Lys
223 <210> SEQ ID NO: 11
224 <211> LENGTH: 10
225 <212> TYPE: DNA
226 <213> ORGANISM: Artificial Sequence
228 <220> FEATURE:
229 <223> OTHER INFORMATION: Description of Artificial Sequence:natural Zif268
230   binding site
232 <400> SEQUENCE: 11
233 gcgtgggcgc                                     10
236 <210> SEQ ID NO: 12
237 <211> LENGTH: 10
238 <212> TYPE: DNA
239 <213> ORGANISM: Artificial Sequence
242 <220> FEATURE:
243 <223> OTHER INFORMATION: Description of Artificial Sequence:target site
244   containing three D-able subsites
W--> 246 <221> NAME/KEY: misc_feature
247 <222> LOCATION: (1)...(10)
248 <223> OTHER INFORMATION: n is a, c, g, or t
W--> 250 <400> 12
W--> 251 ggntgngggnn                                     10
254 <210> SEQ ID NO: 13
255 <211> LENGTH: 10
256 <212> TYPE: DNA
257 <213> ORGANISM: Artificial Sequence
259 <220> FEATURE:
260 <223> OTHER INFORMATION: Description of Artificial Sequence:target site
261   with two overlapping D-able subsites
W--> 263 <221> NAME/KEY: misc_feature
264 <222> LOCATION: (1)...(10)
265 <223> OTHER INFORMATION: n is a, c, g, or t
W--> 267 <400> 13
W--> 268 nngkngknnn                                     10
271 <210> SEQ ID NO: 14
272 <211> LENGTH: 10
273 <212> TYPE: DNA

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```

274 <213> ORGANISM: Artificial Sequence
276 <220> FEATURE:
277 <223> OTHER INFORMATION: Description of Artificial Sequence:target site
278     with three overlapping D-able subsites
W--> 280 <221> NAME/KEY: misc_feature
281 <222> LOCATION: (1)...(10)
282 <223> OTHER INFORMATION: n is a, c, g, or t
W--> 284 <400> 14
W--> 285 nngkngkngk 10
288 <210> SEQ ID NO: 15
289 <211> LENGTH: 22
290 <212> TYPE: DNA
291 <213> ORGANISM: Artificial Sequence
293 <220> FEATURE:
294 <223> OTHER INFORMATION: Description of Artificial Sequence:target site DNA
295     motif searched by protocol 1
W--> 297 <221> NAME/KEY: modified_base
298 <222> LOCATION: (1)...(22)
299 <223> OTHER INFORMATION: n is g, a, c or t
W--> 301 <221> modified_base
302 <222> LOCATION: (10)..(12)
303 <223> OTHER INFORMATION: n = g, a, c or t, may be present or absent
W--> 305 <400> 15
W--> 306 gnggngngnnn nngngngnngn nn 22
309 <210> SEQ ID NO: 16
310 <211> LENGTH: 23
311 <212> TYPE: DNA
312 <213> ORGANISM: Artificial Sequence
314 <220> FEATURE:
315 <223> OTHER INFORMATION: Description of Artificial Sequence:target site DNA
316     motif searched by protocol 1
318 <220> FEATURE:
319 <221> NAME/KEY: modified_base
320 <222> LOCATION: (1)..(23)
321 <223> OTHER INFORMATION: n = g, a, c or t
323 <220> FEATURE:
324 <221> NAME/KEY: modified_base
325 <222> LOCATION: (11)..(13)
326 <223> OTHER INFORMATION: n = g, a, c or t, may be present or absent
328 <400> SEQUENCE: 16
W--> 329 gnggngngnnn nngngngnng nnn 23
332 <210> SEQ ID NO: 17
333 <211> LENGTH: 22
334 <212> TYPE: DNA
335 <213> ORGANISM: Artificial Sequence
337 <220> FEATURE:
338 <223> OTHER INFORMATION: Description of Artificial Sequence:target site DNA
339     motif searched by protocol 1
341 <220> FEATURE:

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RAW SEQUENCE LISTING ERROR SUMMARY  
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Input Set : A:\SUB19496-18.APP  
Output Set: N:\CRF3\05152002\I825242C.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:1; Xaa Pos. 2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,20,21,22,23,24  
Seq#:12; N Pos. 3,6,9,10  
Seq#:13; N Pos. 1,2,5,8,9,10  
Seq#:14; N Pos. 1,2,5,8  
Seq#:15; N Pos. 2,5,6,8,9,10,11,12,14,17,18,20,21,22  
Seq#:16; N Pos. 2,5,6,8,9,10,11,12,13,15,18,19,21,22,23  
Seq#:17; N Pos. 2,5,6,8,9,10,11,12,14,15,17,20,21,22  
Seq#:18; N Pos. 2,5,6,8,9,10,11,12,13,15,16,18,21,22,23  
Seq#:19; N Pos. 2,5,6,8,9,10,11,12,14,17,18,20  
Seq#:20; N Pos. 2,5,6,8,9,10,11,12,13,15,18,19,21  
Seq#:21; N Pos. 2,3,5,8,9,10,11,12,14,17,18,20,21,22  
Seq#:22; N Pos. 2,3,5,8,9,10,11,12,13,15,18,19,21,22,23  
Seq#:23; N Pos. 2,3,5,8,9,10,11,12,14,15,17,20,21,22  
Seq#:24; N Pos. 2,3,5,8,9,10,11,12,13,15,16,18,21,22,23  
Seq#:25; N Pos. 2,3,5,8,9,10,11,12,14,17,18,20  
Seq#:26; N Pos. 2,3,5,8,9,10,11,12,13,15,18,19,21  
Seq#:27; N Pos. 2,3,5,6,8,11,12,13,15,18,19,21,22,23  
Seq#:28; N Pos. 2,3,5,6,8,11,12,13,14,16,19,20,22,23,24  
Seq#:29; N Pos. 2,3,5,6,8,11,12,13,15,16,18,21,22,23  
Seq#:30; N Pos. 2,3,5,6,8,11,12,13,14,16,17,19,22,23,24  
Seq#:31; N Pos. 2,3,5,6,8,11,12,13,15,18,19,21  
Seq#:32; N Pos. 2,3,5,6,8,11,12,13,14,16,19,20,22  
Seq#:33; N Pos. 2,3,5,6,8,11,14,15,17,18,19  
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Seq#:37; N Pos. 2,5,6,8,9,10,11,12,13,15,18,19,21,22,23  
Seq#:38; N Pos. 2,5,6,8,9,10,11,12,14,15,17,20,21,22  
Seq#:39; N Pos. 2,5,6,8,9,10,11,12,13,15,16,18,21,22,23  
Seq#:40; N Pos. 2,5,6,8,9,10,11,12,14,15,17,18,20  
Seq#:41; N Pos. 2,5,6,8,9,10,11,12,13,15,16,18,19,21  
Seq#:42; N Pos. 2,3,5,8,9,10,11,12,14,17,18,20,21,22  
Seq#:43; N Pos. 2,3,5,8,9,10,11,12,13,15,18,19,21,22,23  
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Seq#:50; N Pos. 2,3,5,6,8,11,12,14,15,17,20,21,22  
Seq#:51; N Pos. 2,3,5,6,8,11,12,13,15,16,18,21,22,23  
Seq#:52; N Pos. 2,3,5,6,8,11,12,14,15,17,18,20  
Seq#:53; N Pos. 2,3,5,6,8,11,12,13,15,16,18,19,21  
Seq#:54; N Pos. 2,3,5,6,8,11,14,15,17,18,19

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Seq#:58; N Pos. 2,5,6,8,9,10,11,12,13,15,18,19,21,22,23  
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Seq#:63; N Pos. 2,3,5,8,9,10,11,12,14,17,18,20,21,22  
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Seq#:66; N Pos. 2,3,5,8,9,10,11,12,13,15,16,18,21,22,23  
Seq#:67; N Pos. 2,3,5,8,9,10,11,12,14,15,17,18,20  
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Seq#:76; N Pos. 2,3,5,6,8,11,12,14,17,18,19  
Seq#:77; N Pos. 2,3,5,6,8,11,12,14,15,17  
Seq#:87; N Pos. 10

Invalid Line Length:

The rules require that a line not exceed 72 characters in length. This includes spaces.

Seq#:1; Line(s) 1

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Input Set : A:\SUB19496-18.APP

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L:49 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1 after pos.:0  
L:52 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1 after pos.:16  
L:246 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:250 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:12  
L:251 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:12 after pos.:0  
L:263 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:267 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:13  
L:268 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:13 after pos.:0  
L:280 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:284 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:14  
L:285 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:14 after pos.:0  
L:297 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!  
L:301 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:15  
L:305 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:15  
L:306 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:15 after pos.:0  
L:329 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:16 after pos.:0  
L:352 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:17 after pos.:0  
L:375 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:18 after pos.:0  
L:398 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:19 after pos.:0  
L:421 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:20 after pos.:0  
L:444 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:21 after pos.:0  
L:467 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:22 after pos.:0  
L:490 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:23 after pos.:0  
L:513 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:24 after pos.:0  
L:536 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:25 after pos.:0  
L:559 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:26 after pos.:0  
L:582 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:27 after pos.:0  
L:605 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:28 after pos.:0  
L:628 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:29 after pos.:0  
L:651 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:30 after pos.:0  
L:674 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:31 after pos.:0  
L:697 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:32 after pos.:0  
L:715 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:33 after pos.:0  
L:733 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:34 after pos.:0  
L:751 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:35 after pos.:0  
L:774 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:36 after pos.:0  
L:797 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:37 after pos.:0  
L:820 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:38 after pos.:0  
L:843 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:39 after pos.:0  
L:866 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:40 after pos.:0  
L:889 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:41 after pos.:0  
L:912 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42 after pos.:0  
L:935 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:43 after pos.:0  
L:958 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:44 after pos.:0  
L:981 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:45 after pos.:0  
L:1004 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:46 after pos.:0  
L:1027 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:47 after pos.:0  
L:1050 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:48 after pos.:0



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Input Set : A:\SUB19496-18.APP

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L:1073 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:49 after pos.:0  
L:1096 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:50 after pos.:0  
L:1119 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:51 after pos.:0  
L:1142 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:52 after pos.:0  
L:1165 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:53 after pos.:0  
L:1183 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:54 after pos.:0  
L:1201 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:55 after pos.:0  
L:1219 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:56 after pos.:0  
L:1242 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:57 after pos.:0  
L:1265 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:58 after pos.:0  
L:1288 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:59 after pos.:0